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Description

The present invention relates to a glass antenna terminal device for an automobile in accordance with the preamble of claim 1. Such a device is known from US-A-3 599 214.

There has been proposed to miniaturize a glass antenna system for an automobile by sealing an antenna line 70 of a metallic material in a laminated glass plate 71 and by attaching antenna peripheral circuit elements 72 and other components 73 at a cut portion 74 formed at a circumferential edge of the laminated glass plate 71 as in Japanese Examined Utility Model Publication No. 48681/1977 entitled "Antenna Window Glass" (refer to Figure 14). However, the glass antenna as proposed has disadvantages as follows. When an antenna peripheral circuit element is directly installed in the rear window glass of an automobile, it is difficult to carry out soldering operations because the size of circuit elements is relatively small in comparison with the glass plate. It is difficult to attach the elements onto the rear window glass because a curved glass plate is generally used in considering of design of automogile. When an antenna device is used for receiving radio waves having short wavelengths, the characteristic of the antenna device is influenced by accuracy in positioning of the circuit elements attached to the surface of the glass plate by soldering. It is difficult to obtain highly accurate dimentions, and scattering may result with respect to the performance of the antenna device. Further, it is not desirable to attach the circuit elements on the glass plate from the standpoint of appearance.

As a structure for connecting a power feeding line to a bus bar for an electric heating type defogger installed in the rear window of an automobile, there has been known to connect by soldering a connecting metal fitting having a high tensile strength to a power feeding part which is formed by printing silver paste in a predetermined pattern followed by baking it (refer to Japanese Examined Utility Model Publication 37182/1986 and Japanese Examined Utility Model Publication No. 11745/1972).

It is an object of the present invention to provide a glass antenna device for an automobile comprising packaged antenna peripheral circuit module which is electrically connected to a power feeding point of an antenna conductor formed on or in a glass plate of the automobile, to thereby eliminate various problems in a conventional glass antenna device such that it has been difficult to attach circuit elements on the glass plate by soldering operations; accuracy in position is required to attach the circuit elements when the antenna device is used to receive radio waves having a short wavelength; a beautiful design has not been able to obtain; and it has been difficult to reduce manufacturing cost.

In an embodiment of the present invention, the antenna peripheral circuit is, for instance, a matching peripheral circuit module. In this case, the matching peripheral circuit module is formed by connecting electric elements such as a resistor, a capacitor and a coil, and an electronic element such as a semiconductor attached onto a base plate of a resinous material or ceramics, and then by covering the elements by a resin molding method or with use of ceramics in a packaged form. The matching peripheral circuit module is connected to a power feeding point of an antenna conductor by a method such as soldering, brazing or bonding with an adhesive of an electric conductive material.

In the present invention, an end, ends or a predetermined portion of an antenna conductor which is or are formed by arranging a strip or strips in a predetermined pattern on or in a glass plate of an automobile is or are used as a power feeding point or points for connecting an antenna cable, and if desirable, a connecting metal fitting or fittings susceptible to solder is or are attached to the power feeding point or the points. Then, the antenna peripheral circuit module is connected to the power feeding point. Preferably, it is connected to the power feeding point by using the connecting metal fitting by a suitable method such as soldering. In order to fix the antenna peripheral circuit module onto the glass plate in a stable manner, the antenna peripheral circuit module can be supported by using the connecting metal fitting having a pair of legs bonded to the glass plate. In this case, the both legs of the connecting metal fitting are respectively connected by soldering to one or two power feeding points. The power feeding point may be constituted by a main terminal and a dummy terminal wherein the main terminal is used as a terminal portion to be connected to a receiver.

In accordance with the glass antenna device for an automobile of the present invention, the antenna peripheral circuit such as the matching circuit module is attached on the glass plate at a position near the antenna conductor. Accordingly, the length of a line of connection is electrically short and the circuit has a wiring arranged in a pattern, whereby the stray capacitance of the line can be constant.

The antenna conductor is connected by soldering to the antenna peripheral circuit module in one piece. Accordingly, adjustment of the glass antenna device in an electrical sense can be made uniform.

A packaged top loading circuit module may be connected to an end other than the power feeding point of the antenna conductor on the glass plate.

The present invention is to provide a glass antenna device for an automobile which comprises an antenna glass system in which an antenna conductor and a power feeding point for the antenna conductor are arranged on or in a glass plate to be fitted to a window of the automobile; a connecting metal fitting connected to the power feeding point of the antenna con-

ductor and an antenna peripheral circuit module is electrically connected to and is formed integrally with the terminal of metal.

The present invention is to provide a glass antenna device for an automobile which comprises an antenna glass system in which an antenna conductor and a power feeding point for the antenna conductor are arranged on or in a glass plate to be fitted to a window of the automobile, a connecting metal fitting connected to the power feeding point of the antenna conductor, and an antenna peripheral circuit module comprising a multi-layered ceramic base plate in which at least one resistor is formed in a film having a predetermined pattern on a surface layer of the multi-layered ceramic base plate; one or more number of coils and capacitors are formed in a film having a predetermined pattern on an inner layer of the base plate, and electronic components such as a semiconductor, or another resistor, coil and capacitor having a large capacity or to be prepared according to special requirements, electrically connected to the surface layer of the base plate.

In the antenna device as described above, the antenna conductor is formed by a strip or strips arranged in a glass plate for a window of the automobile in a predetermined pattern, and a power feeding point is connected to an end, each end or a predetermined portion of the antenna conductor to take a radio wave signals received by the antenna conductor. The connecting metal fitting is connected to the power feeding point and an antenna peripheral circuit module.

As the antenna peripheral circuit used for the present invention, various types of circuit such as a matching circuit for matching the impedance between the antenna conductor and the receiver, a pre-amplifying circuit for amplifying a radio wave signal received by the antenna conductor, a reactance circuit or a loading circuit may be employed depending on a purpose of use.

As the base plate on which the above-mentioned antenna peripheral circuit is packaged, a resin type or a ceramic type multi-layered base plate may be used. In particular, a ceramic multi-layered base plate baked at a low temperature is suitably used for the purpose of the present invention. The ceramic multi-layered base plate can contain elements which functions as a coil and a capacitor. An element which functions as a resistor can be formed on a surface layer of the base plate. Accordingly, the antenna peripheral circuit having a compact size and connectable to a connection terminal can be obtained. Further, durability and reliability can be obtained.

In the construction of the antenna peripheral circuit using the ceramic multi-layered base plate, a resistor is formed in a film having a predetermined pattern on the surface layer of the multi-layered ceramic base plate. A coil and a capacitor are formed in a film having a predetermined pattern on an inner layer of the base plate. An electronic component such as a semiconductor or an electric element such as a resistor, a coil and/or a capacitor having a large capacity or to be prepared according to special requirements are attached to predetermined positions of a surface layer of the ceramic multi-layered base plate by means of a suitable bonding method such as soldering.

The connecting metal fitting connected to the power feeding point of the antenna conductor is required to have a large tensile strength. Accordingly, it should have such construction that a tensile strength is directly exerted to the surface of the glass plate for a window of the automobile when a stress is applied to the connecting metal fitting. The base plate of the antenna peripheral circuit should be positioned at a suitable location such as the upper portion, the lower portion, a side portion or the central portion of the terminal to which the tensile stress does not applied. It is desirable that the terminal and the power feeding point of the antenna conductor are close to and connected to each other in order to improve an S/N ratio.

In the present invention, the antenna conductor having a predetermined pattern on or in the glass plate of the automobile is adapted to receive radio waves so that the radio waves are supplied from the power feeding point to the antenna peripheral circuit. The circuit is electrically connected to the terminal which is, in turn, connected to a signal receiving unit such as a radio, a television, a telephone and so on via a connector and a cable.

Thus, even when an external force is applied to the connecting metal fitting, there is no influence to the function of the antenna peripheral circuit, and the external force is applied only to the glass plate. Therefore, the damage of the antenna peripheral circuit can be minimized.

The present invention is to provide glass antenna device for an automobile characterized in that the connecting metal fitting has legs at both sides, a raised portion formed by bending upwardly the intermediate portion between the legs, and a shank portion extending laterally or upwardly from the raised portion; and a ceramic base plate is attached to the back surface of the raised portion so as to connect them electrically, wherein the ceramic base plate is provided, at its other surface opposite the surface attached to the back surface of the raised portion, with a reactance circuit and a terminal piece to be connected to the power feeding point of the antenna conductor, which projects from an opening or a recess formed in one of the side wall portions, and the surrounded portion is filled with a resinous material by molding.

The connecting metal fitting is provided with the terminal piece to be connected to the antenna conductor, which is electrically connected to a predeter-

mined portion of the ceramics base plate. The reactance circuit functioning as the antenna peripheral circuit which is constituted by one or more number of coils, resistors and capacitors is attached to the ceramics base plate which is, in turn, provided with a terminal of signal different from the terminal piece on the opposite surface, and the terminal of signal is electrically connected to the connecting metal fitting. The connecting metal fitting has the shank portion which has such a shape that is electrically and mechanically connectable to an external antenna feeder. The connecting metal fitting has two legs to be connected to the feeding point of the glass plate. The legs are connected by soldering to an electrode (i.e. the power feeding point) which is formed by baking an electric conductive material such as silver paste arranged on the glass plate in a predetermined pattern. The connecting metal fitting is electrically connected the ceramic base plate, the reactance circuit as the antenna peripheral circuit and the terminal piece by soldering or with use of an adhesive, and it secures in one piece by silicone resin or epoxy resin.

As shown in Figure 9, a terminal device 60 connectable to an antenna feeder line is connected by means of soldering, brazing or an adhesive of electrically conductive material to a power feeding portion 44 of an antenna conductor 42 of glass antenna system in which the antenna conductor 42 is formed on a glass plate 41 to thereby form a glass antenna device for an automobile. The reactance circuit can be placed adjacent the antenna element by including the reactance circuit in the terminal of metal.

In drawings:

Figure 1 is a front view of an embodiment of the glass antenna device according to the present invention;

Figure 2 is a front view showing an embodiment of the fitting part of an antenna peripheral circuit as shown in Figure 1;

Figure 3 is a side view of the fitting part shown in Figure 2;

Figure 4 is an enlarged front view of the glass antenna device showing an antenna peripheral circuit module;

Figure 5 is an enlarged front view of an embodiment of the base plate of the antenna peripheral circuit module shown in Figure 1;

Figure 6 is a side view of the base plate shown in Figure 5;

Figure 7 is an enlarged view showing the base plate as in Figure 6;

Figure 8 is a front view of the base plate shown in Figure 7;

Figure 9 is a front view of another embodiment of the glass antenna device according to the present invention;

Figure 10 is a side view partly cross-sectioned of an embodiment of the terminal device according to the present invention;

Figure 11 is a cross-sectional view of a ceramic base plate as shown in Figure 10;

Figure 12 is a front view of another embodiment of the terminal device accroding to the present invention; and

Figure 14 is a perspective view partly broken of a conventional glass antenna device.

Referring to the drawings, preferred Examples of the glass antenna device of the present invention will be described referring to the drawings.

[EXAMPLE 1]

In Figure 1, a reference numeral 1 designates a glass plate for the rear window of an automobile. An antenna conductor 2 is formed on the surface of the glass plate 1 to have a predetermined pattern by strips of conductive material. A terminal device 12 with a matching circuit module as an antenna peripheral circuit is formed in the vicinity of the end of the antenna conductor 2. The terminal device 12 is connected to a power feeding point 5 at an end of the antenna conductor 2. A dummy terminal 6 on the glass plate 1 functions to merely fix the terminal device 12 and it has no wire connection to a power feeding point on the glass plate 1.

Figures 2 and 3 show the terminal device 12 with the matching circuit module 4 as an antenna peripheral circuit module in more detail. The matching circuit module 4 comprises a base plate 9 made of a resinous material or ceramics, one or more number of electric elements 10 such as resistors, capacitors and coils and at least one electronic elements such as a semiconductor, all cooperating to form a matching circuit attached onto the base plate 9. Metal fittings 7, 8 are also placed on the base plate 9. The metal fitting 8 is connected to the power feeding point 5 of the antenna conductor 2 on the glass plate 1, and the metal fitting 7 is connected to the dummy terminal 6 on the glass plate 1. The metal fitting 8 serves as a connector to a receiver so as to transmit a signal.

The base plate 9 on which the electric and electronic elements 10 are formed or mounted is covered with a resin coat 11 to thereby increase reliability.

Thus, by fitting the matching circuit module at the power feeding point on the glass plate 1, the length of line from the antenna conductor to the circuit module can be reduced to thereby interrupt undesired external noises and reduce stray capacitance due to the line of connection. The antenna conductor is formed by using a screen-printing method. Accordingly, good reproducibility is obtainable in manufacturing steps, and a stable antenna system is obtainable. The size of the overall antenna system, and further the manufacturing cost can be reduced.

The terminal device with the matching circuit module can be assembled at the separate place from

a place where the glass plate is produced. Accordingly, the manufacturing and the maintenance of the terminal device, the module and glass plate can be easy.

When an external pressure by, for instance, a cable is applied to the terminal device, it is transmitted directly from the metal fitting 8 to the surface of the glass plate 1 so that the matching circuit module can be protected. Even though the metal fitting 7 is broken, only the dummy terminal 6 is broken and there is no danger of the breaking of the glass plate 1 and the base plate 9.

[EXAMPLE 2]

Another embodiment of the glass antenna device of the present invention in which a matching circuit is used for the antenna peripheral circuit will be described.

In Figure 4, an antenna conductor 22 is formed by arranging strips of electric conductive material in a predetermined pattern on the surface facing the cabin of the glass plate 21 to be fitted to the rear window opening of an automobile. A radio wave signal received by the antenna conductor 22 is transmitted from a power feeding point 23 to a matching circuit module 24. The matching circuit module 24 is attached onto the glass plate 21 by connecting the connecting metal fitting 32 by soldering. As shown in Figure 6, the power feeding point 25 is connected to the electrode of the matching circuit module 27 by soldering.

In this Example, a connecting element 26 of a connecting metal fitting 32 is used as an output terminal for the matching circuit module 24 as shown in Figure 6. By inserting a connector to the connecting element 26, the signal can be led to the outside. The connector is to supply a radio wave signal to a signal receiving unit through a coaxial cable.

In Figure 6, the terminal device 33 is so constructed that a base plate 27 for the matching circuit module 24 is connected to the connecting metal fitting 32 by soldering or a suitable method, which functions as an electrode for the base plate 27 as well as a fitting means. The connecting metal fitting 32 is connected integrally with the base plate 27 by soldering or another suitable method. Further, the base plate 27 is sealingly surrounded by a resin mold so as to increase reliability.

Figure 7 is an enlarged side view of the base plate 27 and Figure 8 is an enlarged front view of the base plate, wherein a coil 29 and a capacitor 30 are respectively elements of a surface fitting type, and they are attached onto a ceramic base plate 28. A resistor 35 is formed by a printing method. The ceramic base plate 28 has a multi-layered structure in which a number of films having predetermined patterns including coils and capacitors are laminated. In Figures 7 and 8, a numeral 34 designates a line connecting structural elements, which are arranged in a pattern, a numeral 31 is an electrode as an input part for signal from the antenna conductor, which is connected with a terminal of metal by soldering, and a numeral 33 designates an output part for outputting a signal which is supplied to the signal receiving unit.

The antenna peripheral circuit module shown in Figures 7 and 8 can be extremely compact. Further, durability to an external force of the module is the same level as that of the conventional device since the antenna peripheral circuit is attached to the back surface side of the connecting metal fitting. A desired S/N ratio is obtainable because the antenna peripheral circuit module is placed in the vicinity of the power feeding point of the antenna conductor. When the glass antenna device is used for receiving radio waves having a short wavelength, accuracy in dimensions depends on the arrangement of the structural elements on the ceramic base plate. Accordingly, scattering of the performance of antenna can be minimized by paying attention to the accurate arrangement of the elements when the circuit module is assembled.

The antenna peripheral circuit module can eliminate the disadvantages that it is difficult to directly attach the structural elements of the antenna device on a curved glass plate to be fitted to a window of an automobile and it is difficult to attach them by soldering because the structural elements are relatively small in comparison with the size of the glass plate.

[EXAMPLE 3]

Figure 9 is a front view showing another embodiment of the glass antenna device formed in a glass plate to be fitted to the rear window opening of an automobile. An antenna conductor 42 is arranged at the upper portion of the glass plate 41. A number of electric heating elements are arranged in the center portion of the glass plate to form a defogger. Terminals 47 (47a, 47b) for power feeding parts which supply a current to the electric heating type elements of the defogger may be conventionally used terminals.

Figure 10 is a side view showing a terminal of metal 46 of a terminal device 60 for the antenna conductor. In Figure 10, the connecting metal fitting 46 is provided with legs 49, (49a, 49b) at both side portions. The legs are fixed onto the glass plates 41 by soldering at a power feeding part 44 which is formed by baking a printed pattern of silver paste formed at a predetermined portion of the glass plate 41.

The terminal of metal 46 further has a raised portion 50 which is formed at the intermediate portion between the legs 49a, 49b and a pair of side wall portions 57 extending downwardly from the two other sides of the raised portion so that a surrounded portion with an open bottom is formed. As shown in Figure 11 of a cross-sectional view showing the inside of the surrounded portion, a ceramic base plate 53 is

placed in the surrounded portion. On the ceramic base plate 53, a coil 54 and a capacitor 53 are electrically and mechanically connected by a solder layer 52. The opposite surface of the ceramic base plate 53 is attached to the back surface of the raised portion 50 by another solder layer 52. The inside of the surrounded portion is entirely or partially filled with a resinous material 56 for sealing such as silicon resin by molding to cover the ceramic base plate 53 as well as the electric and electronic elements. A terminal piece 51 to be connected to the antenna conductor is connected to a connecting terminal of the ceramic base plate 53. A shank portion 48 to be connected to the feeder line is formed integrally with the connecting metal fitting 46. The shank portion 48 is extended upwardly or laterally from the raised portion 50 of the connecting metal fitting 46.

As shown in Figure 12, the terminal piece 51 connectable to the power feeding point of the antenna conductor is adapted to be connected to a power feeding portion 44 in the same manner that the legs 49a, 49b are. However, it is possible to change the position of the terminal piece 51 as shown in Figure 13. The terminal piece 51 to be connected to the power feeding part of the antenna conductor may be so formed that it projects through an opening or a recess formed in one of the side wall portions of the connecting metal fitting 46.

In this Example, the connecting metal fitting is attached to the surface of the glass plate at the power feeding part by soldering with a sufficient strength to a force pulling the terminal upwardly. The strength of attaching the connecting metal fitting to the glass plate is the same as that of the conventional terminal for a defogger attached to the rear window glass of an automobile.

Thus, by unifying the connecting metal fitting, the antenna peripheral circuit, the terminal piece and the ceramic base plate, a compact terminal device with an antenna peripheral circuit module is obtainable and an excellent design can be provided for the glass antenna device. Since the antenna elements and the antenna peripheral circuit are electrically adjacent to each other, a noiseless antenna device can be prepared. Further, the difficulty of attaching the structural elements having a small size in comparison with the size of the plate can be eliminated by constituting the structural elements in a unit. In addition, use of the antenna peripheral circuit module reduces the manufacturing cost.

Claims

1. A glass antenna terminal device (12) for an automobile, the glass antenna comprising an antenna conductor (2) formed to an automobile window glass plate (1), said antenna conductor (2) defining a power feeding point (5) which is connected to the terminal device (2) having an antenna peripheral circuit, the terminal device being characterized in that it has legs at both sides, and by further having connecting metal fittings (7,8) forming said legs, a raised portion and a shank extending from said raised portion intermediate said legs and wherein said legs are connected to said glass plate for attaching said fittings (7,8) to said glass plate; said antenna peripheral circuit being a module being mechanically mounted to said connecting metal fittings (7,8) and electrically connected hereto.

2. The device according to Claim 1, wherein said antenna peripheral circuit module comprises a plurality of resistors, capacitors and coils and at least one electronic device for constituting an antenna peripheral circuit, which are attached onto a base plate of a resinous material and which are covered by molding a resinous material, and said antenna peripheral circuit module is connected by soldering to said power feeding point of the antenna conductor formed to said glass plate.

3. The device according to Claim 1, wherein said antenna peripheral circuit module comprises a plurality of resistors, capacitors and coils and at least one electronic device for constituting an antenna peripheral circuit, which are attached onto to a base plate of ceramics and which are covered by molding a resinous material, and said antenna peripheral circuit module is connected by soldering to said power feeding point of the antenna conductor formed to said glass plate.

4. The device according to Claim 1, wherein said antenna peripheral circuit module comprises a plurality of resistors, capacitors and coils and at least one electronic device for constituting an antenna peripheral circuit, which are received in a ceramic package in a sealed condition, and said antenna peripheral circuit module is connected by soldering to said power feeding point of the antenna conductor formed to said glass plate.

5. The device according to Claim 1, wherein said antenna peripheral circuit module comprises a multilayered ceramic base plate in which at least one resistor is formed in a film having a predetermined pattern on a surface layer of said multilayered ceramic base plate; a plurality of coils and capacitores are formed in a film having a predetermined pattern on an inner layer of said base plate, and electronic components are elctrically connected to the surface layer of said base plate.

6. The device according to Claim 1, wherein said an-

tenna peripheral circuit module is a matching circuit for matching the impedance between the antenna conductor and a receiver.

7. The device according to Claim 1, wherein said antenna peripheral circuit module is a pre-amplifier for amplifying radio wave signals received by the antenna conductor.

8. The device of Claim 1, wherein said connecting metal fitting has two legs, one of said legs being fixed to said power feeding point and another of said two legs being fixed to a dummy terminal.

9. The device of Claim 1 wherein said connecting metal fitting has two legs, and said power feeding point is independent of said two legs.

10. The device of Claim 8 wherein said circuit module includes a base plate having ends connected to respective ones of said legs.

11. The device of Claim 1 including molded resin enclosing said module.

12. The device of Claim 9 wherein said raised portion of said connecting metal fitting has side wall portions extending downwardly toward the glass plate to form a surrounded portion, and wherein said circuit module is mounted in said surrounded portion.

Patentansprüche

1. Scheibenantenne-Anschlußvorrichtung (12) für ein Kraftfahrzeug, wobei die Scheibenantenne eine auf einer Fensterglasplatte (1) eines Kraftfahrzeugs ausgebildete Antennenleitung (2) aufweist, die einen Spannungsspeisepunkt (5) festlegt, der mit der eine periphere Antennenschaltung aufweisenden Anschlußvorrichtung (2) verbunden ist, die **dadurch gekennzeichnet ist, daß** sie folgendes aufweist: Beine an beiden Seiten und ferner die Beine bildende metallische Anschlußbefestigungen (7, 8), einen erhöhten Bereich und einen Schenkel, der sich vom erhöhten Bereich aus zwischen den Beinen erstreckt, wobei die Beine mit der Glasplatte verbunden sind, um die Befestigungen (7, 8) mit der Glasplatte zu verbinden, wobei die periphere Antennenschaltung ein Modul ist, das mechanisch an den metallischen Anschlußbefestigungen (7, 8) angebracht ist und mit diesen elektrisch verbunden ist.

2. Vorrichtung nach Anspruch 1, bei der das Modul mit peripherer Antennenschaltung mehrere Widerstände, Kondensatoren und Spulen und mindestens ein elektronisches Bauelement zum Aufbauen einer peripheren Antennenschaltung aufweist, die auf einer Trägerplatte aus Harzmaterial angebracht sind und die durch Vergießen mit einem Harzmaterial abgedeckt sind, wobei das Modul mit peripherer Antennenschaltung durch Löten mit dem Spannungsspeisepunkt der auf der Glasplatte ausgebildeten Antennenleitung verbunden ist.

3. Vorrichtung nach Anspruch 1, bei der das Modul mit peripherer Antennenschaltung mehrere Widerstände, Kondensatoren und Spulen und mindestens ein elektronisches Bauelement zum Aufbauen einer peripheren Antennenschaltung aufweist, die auf einer Trägerplatte aus Keramik angebracht sind und durch Vergießen mit einem Harzmaterial abgedeckt sind, wobei das Modul mit peripherer Antennenschaltung durch Löten mit dem Spannungsspeisepunkt der auf der Glasplatte ausgebildeten Antennenleitung verbunden ist.

4. Vorrichtung nach Anspruch 1, bei der das Modul mit peripherer Antennenschaltung mehrere Widerstände, Kondensatoren und Spulen und mindestens ein elektronisches Bauelement zum Aufbauen einer peripheren Antennenschaltung, die in einem Keramikgehäuse in abgedichtetem Zustand enthalten sind, wobei das Modul mit peripherer Antennenschaltung durch Löten mit dem Spannungsspeisepunkt der auf der Glasplatte ausgebildeten Antennenleitung verbunden ist.

5. Vorrichtung nach Anspruch 1, bei der das Modul mit peripherer Antennenschaltung eine mehrschichtige Keramikträgerplatte aufweist, in der mindestens ein Widerstand in einem Film mit vorgegebenem Muster auf einer Oberflächenschicht der mehrschichtigen Keramikträgerplatte ausgebildet ist; mehrere Spulen und Kondensatoren in einem Film mit vorgegebenem Muster auf einer inneren Schicht der Trägerplatte ausgebildet sind und elektronische Komponenten elektrisch mit der Oberflächenschicht der Trägerplatte verbunden sind.

6. Vorrichtung nach Anspruch 1, bei der das Modul mit peripherer Antennenschaltung eine Anpassungsschaltung zum Vornehmen einer Impedanzanpassung zwischen der Antennenleitung und einem Empfänger ist.

7. Vorrichtung nach Anspruch 1, bei der das Modul mit peripherer Antennenschaltung ein Vorverstärker zum Verstärken von von der Antennenleitung empfangener Radiowellensignale ist.

8. Vorrichtung nach Anspruch 1, bei der die metallische Anschlußbefestigung zwei Beine aufweist, von denen das eine mit dem Spannungsspeisepunkt verbunden ist und das andere mit einem Blindanschluß verbunden ist.

9. Vorrichtung nach Anspruch 1, bei der die metallische Anschlußbefestigung zwei Beine aufweist und der Spannungsspeisepunkt unabhängig von den zwei Beinen ist.

10. Vorrichtung nach Anspruch 8, bei der das Schaltungsmodul eine Trägerplatte aufweist, deren Enden mit einem jeweiligen der Beine verbunden sind.

11. Vorrichtung nach Anspruch 1, mit einem das Modul umschließenden Harzverguß.

12. Vorrichtung nach Anspruch 9, bei der der erhöhte Bereich der metallischen Anschlußbefestigung Seitenwandbereiche aufweist, die sich nach unten zur Glasplatte hin erstrecken, um einen umschlossenen Bereich auszubilden, und bei der das Schaltungsmodul in diesem umschlossenen Bereich angebracht ist.

Revendications

1. Dispositif de connexion (12) d'une antenne sur vitre, pour un véhicule automobile, l'antenne sur vitre comprenant un conducteur d'antenne (2) formé sur une plaque de verre (1) constituant une vitre de véhicule automobile, ledit conducteur d'antenne (2) présentant un point d'alimentation en énergie (5) qui est relié au dispositif de connexion (12) comportant un circuit périphérique d'antenne, le dispositif de connexion étant caractérisé en ce qu'il comporte des pattes de chaque côté, et par le fait qu'il comporte en outre des ferrures métalliques de raccordement (7, 8) constituant lesdites pattes, une partie surélevée et une tige s'étendant sur ladite partie surélevée entre lesdites pattes, lesdites pattes étant reliées à ladite plaque de verre pour la fixation desdites ferrures (7, 8) à ladite plaque de verre; ledit circuit périphérique d'antenne étant un module qui est monté mécaniquement sur lesdites ferrures métalliques de raccordement (7, 8) et est électriquement relié à ces dernières.

2. Dispositif selon la revendication 1, dans lequel ledit module formant le circuit périphérique d'antenne comprend plusieurs résistances, condensateurs et inductances ainsi qu'au moins un dispositif électronique pour constituer un circuit périphérique d'antenne, ces composants étant fixés sur une plaque de base en un matériau formé de résine et étant recouverts par moulage d'un matériau formé de résine, et ledit module formant le circuit périphérique d'antenne étant relié par soudage, audit point d'alimentation en énergie du conducteur d'antenne formé sur ladite plaque de verre.

3. Dispositif selon la revendication 1, dans lequel ledit module constituant le circuit périphérique d'antenne comprend plusieurs résistances, condensateurs et inductances ainsi qu'au moins un dispositif électronique pour constituer un circuit périphérique d'antenne, ces composants étant fixés sur une plaque de base en céramique et étant recouverts par moulage d'un matériau formé de résine, et ledit module formant le circuit périphérique d'antenne étant relié, par soudage, audit point d'alimentation en énergie du conducteur d'antenne formé sur ladite plaque de verre.

4. Dispositif selon la revendication 1, dans lequel ledit module formant le circuit périphérique d'antenne comprend plusieurs résistances, condensateurs et inductances ainsi qu'au moins un dispositif électronique pour constituer un circuit périphérique d'antenne, ces composants étant reçus dans un boîtier en céramique, sous des conditions d'étanchéité, et ledit module formant le circuit périphérique d'antenne étant relié, par soudage, audit point d'alimentation en énergie du conducteur d'antenne formé sur ladite plaque de verre.

5. Dispositif selon la revendication 1, dans lequel ledit module formant le circuit périphérique d'antenne comprend une plaque de base en céramique multicouche, dans laquelle au moins une résistance est formée en un film ayant un motif prédéterminé sur une couche superficielle de ladite plaque de base en céramique multicouche; plusieurs inductances et condensateurs sont formés en un film ayant un motif prédéterminé sur une couche intérieure de ladite plaque de base, et des composants électroniques sont reliés électriquement à la couche superficielle de ladite plaque de base.

6. Dispositif selon la revendication 1, dans lequel ledit module formant le circuit périphérique d'antenne est un circuit d'adaptation pour adapter l'impédance entre le conducteur d'antenne et un récepteur.

7. Dispositif selon la revendication 1, dans lequel ledit module formant le circuit périphérique d'antenne est un préamplificateur pour amplifier des signaux de radiodiffusion captés par le conducteur

d'antenne.

8. Dispositif selon la revendication 1, dans lequel ladite ferrure métallique de raccordement comporte deux pattes, l'une desdites pattes étant fixée audit point d'alimentation en énergie et la seconde desdites deux pattes étant fixée à une borne fictive.

9. Dispositif selon la revendication 1, dans lequel ladite ferrure métallique de raccordement comporte deux pattes, et ledit point d'alimentation en énergie est indépendant desdites deux pattes.

10. Dispositif selon la revendication 8, dans lequel ledit module formant circuit comprend une plaque de base possédant des extrémités reliées respectivement auxdites pattes.

11. Dispositif selon la revendication 1, comprenant un moulage en résine enveloppant ledit module.

12. Dispositif selon la revendication 9, dans lequel ladite partie surélevée de ladite ferrure métallique de raccordement présente des parties de paroi latérale qui s'étendent vers le bas en direction de la plaque de verre, pour définir une enceinte, et dans lequel ledit module formant circuit est installé dans ladite enceinte.

FIGURE 1

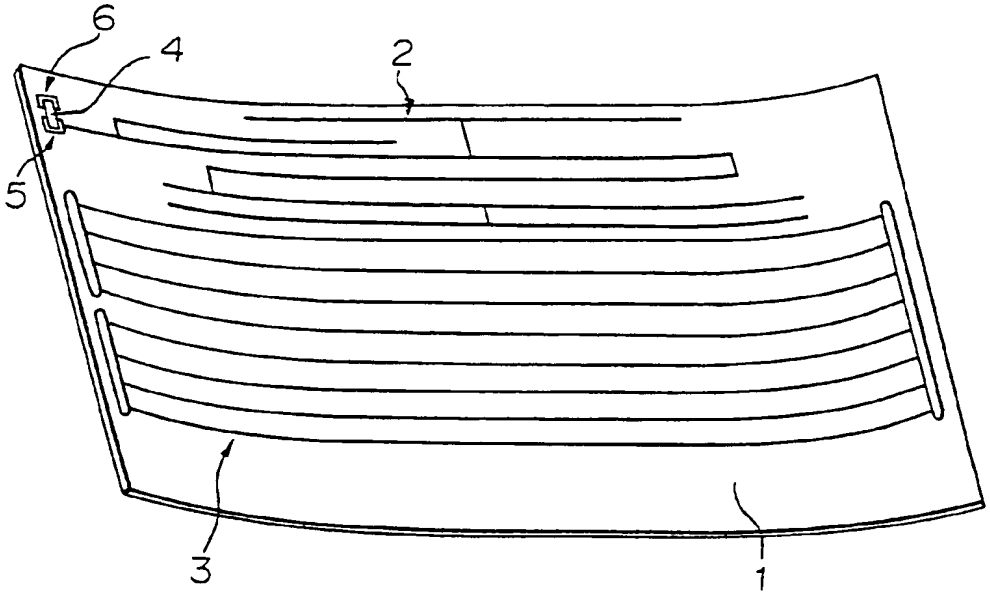


FIGURE 2

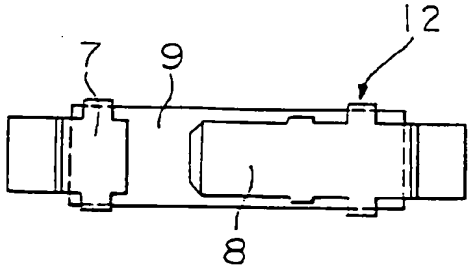


FIGURE 3

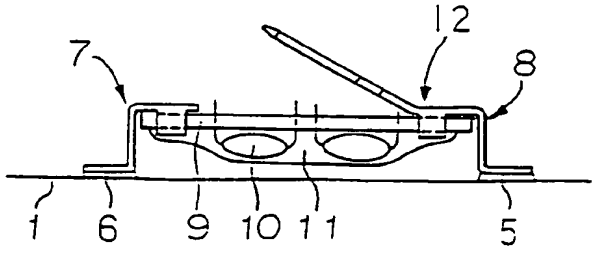


FIGURE 4

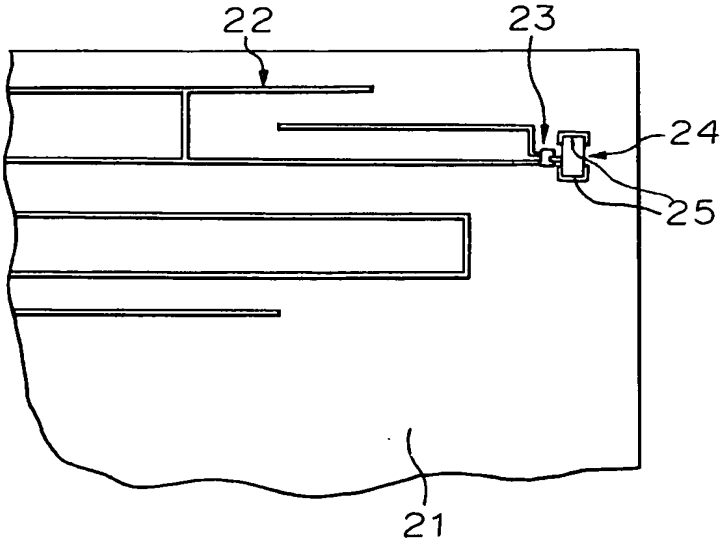
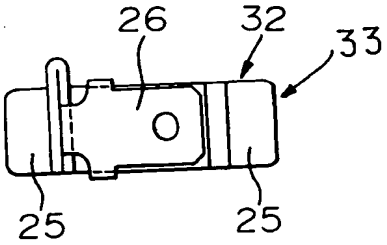


FIGURE 5



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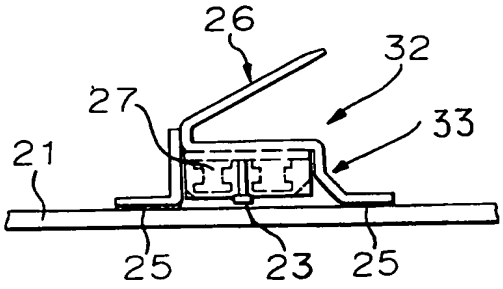


FIGURE 7

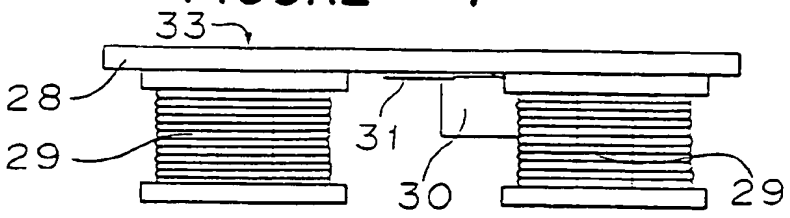
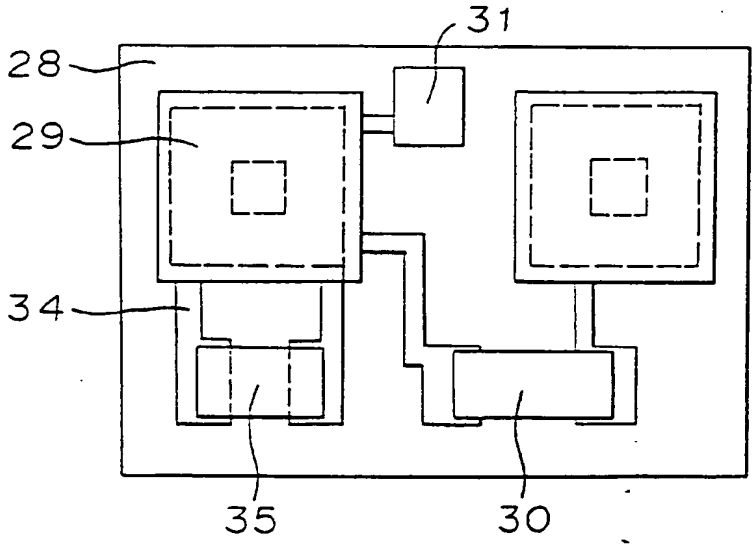


FIGURE 8



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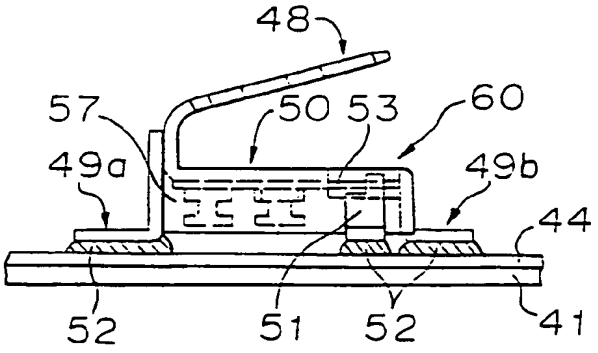

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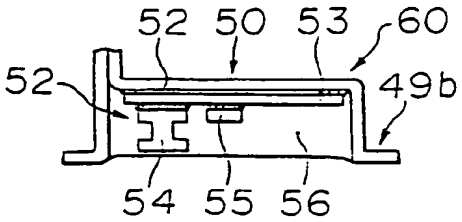

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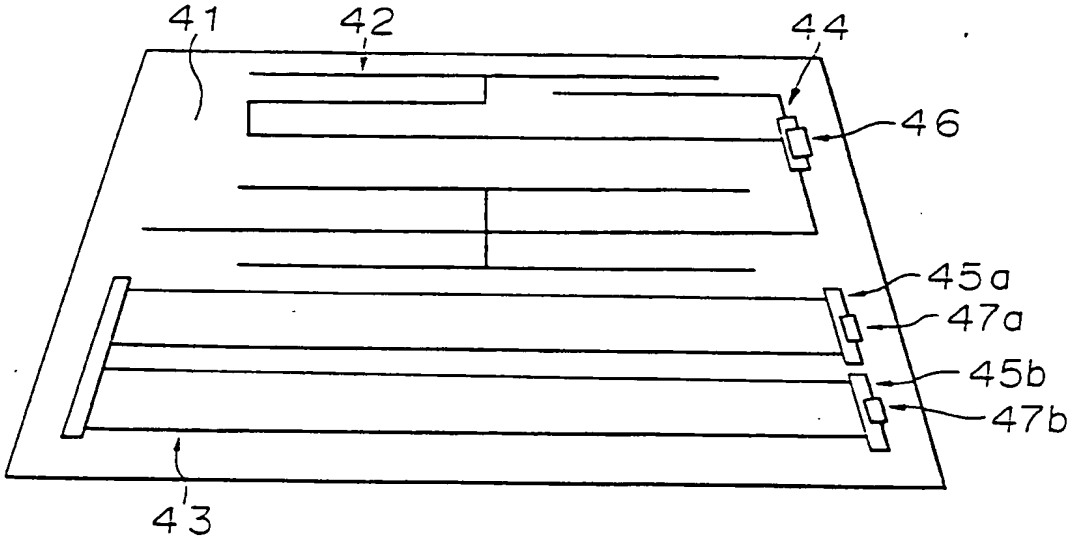

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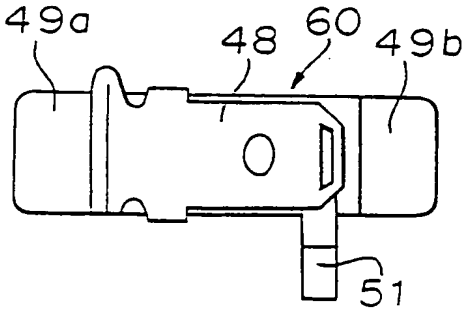

FIGURE 13

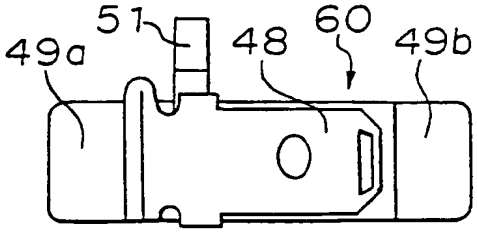

FIGURE 14